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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Art Unit 3673, Application No. 09/751,264
Examiner: Mr. Frederick L.Lagman

The following changes and comments are submitted in response to Office Action dated July 23, 2003:

1. The applicant appreciates the Examiner's encouragement of Allowable Subject Matter related to Claim 3.

2. Response to Office Action items 1 and 2.
The "substructure having space to allow piping access to ocean bottom" feature is canceled from Claim 1, and no drawing or specification changes are proposed.

3. Response to Office Action item 4.
Howard stated "...The tank has a slight upward buoyancy. It is held in position by a long, preferably flexible conduit connected to the well head...Alternately, riser conduit means 22 can be made of high strength steel...Thus, by controlling the buoyancy of the floating tank, the strength required in riser conduit means 22 can also be minimized..." It also should be noted that Howard designed a completion assembly for use in fairly shallow water and never contemplated in the patent large deep-water drilling platforms with unanticipated vertical oscillation challenges.

Howard recognized static buoyancy forces. The tension designed into the riser conduit means that the conduit would act as a spring to affect the K coefficient of the second order differential equation from applicant's specifications. Should vertical oscillations cause the platform to dip sufficiently to relief all tension in the riser conduit, the K becomes a variable coefficient, and the solution to the differential equation becomes more complicated. While Howard did not provide enough details for a complete dynamics analysis of his platform, it could have survived the tests of ocean waves due to the structure's small mass and the strong riser conduit with a relatively short length in shallow water.

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Scaling up Howard's design would create problems that Howard did not envisage. For large drilling and production platforms in deep water, the design must ensure that the natural frequency of vertical oscillation is outside the frequency range of ocean waves. Tethering a massive MWB drilling platform in shallow water with a short conduit would likely drive natural frequency up into the range of ocean waves, leading to potentially catastrophic results. It should be noted that the applicant does not propose to place a large floating structure in shallow waters tied by a short conduit; the case here only makes a point that Howard can not be scaled up without consideration of other factors.

Accordingly, Claim 1 is revised as follows to differentiate from Howard,

1. A floating platform comprising:
drilling and production facilities; a superstructure; a minimized wave-zone buoyancy structure; and a substructure;
with said minimized wave-zone buoyancy structure having a low cross sectional area;
with the minimized wave-zone buoyancy structure having sufficient height to range over ocean waves;
with said substructure alone effective in providing buoyancy and stability;
with said superstructure having space to house said drilling and production facilities; and
with the minimized wave-zone buoyancy structure effective in transmitting ***the*** superstructure's weight to the substructure.

Claim 4 is not changed as it is hoped that the stated revisions to Claim 1 are sufficient to establish it as an independent claim.

4. Response to Office Action item 6.
Although live load stabilizers do create drag when they are submerged, and the live load stabilizers do change the K coefficient of the differential equation as argued by applicant in the prior response, the dynamic effect of the live load stabilizers is secondary to their primary purpose of existence. The 3rd paragraph on page 5 of the specifications states "As MWB structure 30 provides limited additional buoyancy capacity and to ensure platform stability with variable superstructure live loads, live load stabilizer 70 increases water displacement at water level 10." In the 4th paragraph, it went on to say "For live loads with mass changes beyond the displacement capacity of live load stabilizer 70, an active platform weight management system could pump water in or out of ballast 50 to accommodate large changes." Applicant had intended static stability from large live load changes as the primary reason for installation of the live load stabilizers but had included discussions of effects of dynamics of motion solely for the sake of academic completeness on the subject. Accordingly, Claim 2 is revised as follows to further differentiate from Johnson et al,

2. A floating platform according to claim 1, further comprising one or more live load stabilizers, with said live load stabilizer or stabilizers attached to said minimized wave-zone buoyancy structure at a region from slightly above water level to slightly below water level ***so that the live load stabilizer or stabilizers operate in and out of the water*** and ***are*** effective in ***displacing water and in*** providing ***increased*** buoyancy lift ***when submerged***.

5. Response to Office Action item 7.
Claim 3 is not changed as it is hoped that the stated revisions to Claim 1 are sufficient to establish it as an independent claim.

6. Solely to meet 35 U.S.C. 102 with respect to Howard, Item 3 above revises Claim 1 with limitations that are restrictive compared to the applicant's understanding on the subject. The specifications detailed mathematical analysis of dynamics of motion and an invention to control and lower the natural frequency of oscillation of a floating object by reducing the cross sectional area of the part of the object that is exposed to wave action. Such basic principle espoused by the applicant applies to any floating object, not just production and drilling platforms, and Claim 1 as originally submitted would have reflected the applicant's general understanding. As limitations are introduced in the revised Claim 1, a Claim 5 of new use is requested as follows,

> 5. A method of reducing vertical natural frequency of oscillation of a floating object that comprises a superstructure, a minimized wave-zone buoyancy structure, and a substructure, with said minimized wave-zone buoyancy structure having a reduced cross sectional area.

The applicant hopes the above presentation has been sufficiently clear and has adequately addressed the Office Action objections.

Sincerely,

Andrew W. Chow

Andrew W. Chow, Applicant
15306 Parkville Dr.
Houston, TX 77068